REMARKS

The Office Action mailed April 10, 2007 has been reviewed and carefully considered. No new matter has been added.

Claims 1-14 are pending.

Initially, the Applicants gratefully acknowledge the Examiner's indication of allowable subject matter. In particular, Claims 2, 10, and 12 have been objected to and would be allowable if re-written to include the limitations of the base claim and any intervening claims.

Claims 1, 3-9, 11, and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,081,551 to Etoh (hereinafter "Etoh") in view of U.S. Patent No. 5,467,136 to Odaka et al. (hereinafter "Odaka"). Moreover, Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Etoh and Odaka as applied to Claim 9 above, and further in view of U.S. Patent No. 6,782,054 to Bellers (hereinafter "Bellers").

It is respectfully asserted that none of the cited references teach or suggest "a reference picture weighting factor assignor responsive to the relative positioning between the image block and first and second reference pictures indicated by the plurality of reference picture indices, the reference picture weighting factor assignor for calculating respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures", as recited in independent Claim 1.

Further, it is respectfully asserted that none of the cited references teach or suggest "calculating implicit weighting factors for the image block responsive to the relative positioning between the image block and first and second reference pictures indicated by first and second reference picture indices based on respective distances of the image block to the first and second reference pictures", as recited in independent Claim 9.

The Examiner has cited and stated the following in support of his argument that Odaka discloses the preceding limitations of Claims 1 and 9: "However, Odaka et al teaches a video coding apparatus which forms an optimum prediction signal which is designated by a set of motion vectors of separate reference pictures comprising calculating respective implicit weighting factors (Fig. 1, 31-32) for the first (15) and second (16) reference pictures based on respective distances (Fig. 26, n and n-1) of the image block to the first and second reference pictures for preventing a deterioration in prediction performance (col. 7, lines 29-47; col. 21,

lines 20-45)." The Applicants respectfully disagree with the Examiner's reading of Odaka and, further, respectively assert that Odaka does not even remotely teach or suggest the preceding limitations of Claims 1 and 9.

The Applicants immediately hereinafter reproduce the cited textual sections of Odaka for the Examiner's convenience.

Column 7, lines 29-47 of Odaka disclose the following (emphasis added):

> The interpolation circuit 19 comprises an intra-field interpolation circuit 30, multipliers 31 and 32, and an adder 33. The interpolation circuit 19 forms the reference video signal 12 by mixing a signal, formed by the intra-field interpolation circuit 30 using an output signal from the field memory 15, with an output signal from the field memory 16 at a mixing ratio of k:1-k.
>
> <u>The motion vector candidate 18 output from the motion vector searching circuit 17 is also input to the interpolation circuit 19 to control a parameter k for determining the mixture ratio between output signals from the field memories 15 and 16.</u> More specifically, if the vertical component of the motion vector candidate 18 corresponds to intra-field n+½ lines (n is an integer), control is performed to set k=l so that a corresponding pixel value stored in the field memory 15 (in this case, it is assumed that a video close to a to-be-coded video is stored in the field memory 15) is directly output as the reference video signal 12.

Column 21, lines 20-45 of Odaka disclose the following (emphasis added):

<u>FIG. 26 shows a detailed example of how the abovementioned motion vector is transmitted</u>, in which the difference (indicated by the arrow (difference vector d) extending in the vertical direction in FIG. 26) between a motion vector with a precision of one pixel (indicated by the arrow (motion vector <u>b</u>) on the lower side in FIG. 26) in the reference field #2 and a point "●" nearest to a point "Δ" at which a motion vector with a precision of ½ pixels (indicated by the arrow (motion vector a) on the upper side in FIG. 26) in the reference field #1 crosses the reference field #2 is transmitted with a precision of one pixel. In the case shown in FIG. 26, the difference is -1. With this operation, the data amount of a motion vector can be saved without causing a deterioration in prediction performance.

<u>In summary, the variable length coder 713 subjects the base vector of motion vector data sent from the second motion vector detector 711 to a variable length coding without any modification. However, as for coding of nonbase vector of the motion vector data, the base vector is scaled into a motion vector in the non-base field, a difference between the non-base vector and the scaled motion vector is calculated and it is subjected to the variable length coding.</u> The motion vector data includes the field parity data described above. In addition, the prediction mode data is also sent from the second motion vector detector 711. These data are also subjected to a variable-length coding.

Thus, in Figure 1 of Odaka, blocks 31 and 32 assign weights to two fields, basing the weighting factors upon the value of the motion vector. For example, as explained at column 7, lines 36-41 of Odaka with respect to Figure 1, "The motion vector candidate 18 output from the motion vector searching circuit 17 is also input to the interpolation circuit 19 to control a parameter k for determining the mixture between output signals from the field memories 15 and 16." Thus, it is clear that the cited sections of Odaka disclose that the weighting factor assignment is based on a motion vector value, and NOT "based on respective distances of the image block to the first and second reference pictures" as explicitly recited in Claims 1 and 9.

Moreover, with respect to Figure 26 and column 21, lines 20-45 of Odaka, while the same discloses the use of relative field distances, such use is for an operation completely unrelated to assigning weights, namely such use is disclosed for implementing variable length coding of motion vectors for transmission. For example, Figure 26 and column 21, lines 20-45 of Odaka disclose how a motion vector value is coded for transmission, using differential values based upon relative field distances, and applying variable length coding to the base vector and difference between the scaled vector and the base vector, which has nothing to do with assigning weights to reference pictures as recited in Claims 1 and 9.

Further, column 23, lines 22-44 of Odaka, which correspond to Figure 6 of Odaka, and which were not explicitly cited by the Examiner, are nonetheless reproduced as follows:

> In FIG. 26, the field distance between the base field #1 and the field being decoded (this field has been referred to a to-be-coded field for descriptive convenience for coding) can be calculated, using the field number of base field #1 and that of the field being decoded, and the data indicating the prediction direction of the field being decoded. Assume that this field distance is "n". In this case, <u>to scale a motion vector</u> <u>a</u> to the reference field #1 serving as the base field into a motion vector to the reference field #2 serving as the non-base field, the following expression is calculated, and the resultant fraction is rounded to a nearest point, as indicated by a vector <u>c</u> to a black dot in FIG. 26.
>
> (Motion Vector to Base Field #1)X(n-1)/n
>
> The motion vector to the reference field #2 serving as the non-base field is obtained by adding the difference vector <u>d</u> (-1 in FIG. 26) to the scaled and rounded motion vector <u>c</u>. Referring to FIG. 26, if the reference field #2 is the base field, the motion vector to the base field #2 is multiplied with (n+l)/n to

> perform scaling into the motion vector to the reference field #1 serving as the non-base field. Either case is selected from the field parity data.

Thus, Figure 26 and column 23, lines 22-44 of Odaka disclose the calculation of a scaled motion vector based upon relative field distances. That is, the preceding section of Odaka discloses the scaling of motion vectors based on relative distances, and not determining weighting factors to apply to reference pictures based on relative distances from an image block to the reference pictures as essentially recited in Claims 1 and 9.

Etoh does not cure the deficiencies of Odaka, and is silent with respect to the above-recited limitations of Claims 1 and 9. For example, as admitted by the Examiner, "Etoh does not particularly disclose calculating respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures" (Office Action, p. 3).

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art" (MPEP §2143.03, citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)).

Accordingly, Claims 1 and 9 are patentably distinct and non-obvious over the cited references for at least the reasons set forth above.

"If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious" (MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)).

Claims 3-8 depend from Claim 1 or a claim which itself is dependent from Claim 1 and, thus, include all the limitations of Claim 1. Claim 11 depends from Claim 9 and thus include all the limitations of Claim 9. Accordingly, Claims 3-8 and 11 are patentably distinct and non-obvious over the cited reference for at least the reasons set forth above with respect to Claims 1 and 9, respectively.

Thus, reconsideration of the rejections is respectfully requested.

In view of the foregoing, Applicants respectfully request that the rejection of the claims set forth in the Office Action of April 10, 2007 be withdrawn, that pending claims 1-14 be allowed, and that the case proceed to early issuance of Letters Patent in due course.

No fee is believed due with regard to the filing of this amendment. However, if a fee is due, please charge Deposit Account No. 07-0832.

Respectfully submitted,

Jill MacDonald Boyce

By: /Guy H. Eriksen/

Patent Operations
Thomson Licensing LLC
P.O. Box 5312
Princeton, NJ 08543-5312

Guy H. Eriksen, Attorney for Applicants
Registration No.: 41,736
(609) 734-6807

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